

Notes on the late Admiral Smyth's "*Cycle of Celestial Objects*,"
Volume the Second, commonly known as the "*Bedford Catalogue*."
By Herbert Sadler, Esq.

In the year 1844 Admiral (then Captain) Smyth published his *Cycle of Celestial Objects*, for the second volume of which, commonly known as the "*Bedford Catalogue*," the author in the ensuing year received the Gold Medal of the Society. I may be mistaken, but it seems to me that the Presidential Address on that occasion is couched in eminently cautious language as to the exactness of the micrometrical measures in Admiral Smyth's work. If this be the case, it has been abundantly justified by the results. The following facts may perhaps convey some idea of the intrinsic value of the measures recorded therein. In the first hour of right ascension there are 108 measures (54 of the position angles and 54 of the distances) of 36 different objects, being stars with comites, double, triple, or multiple stars. Of these 108 measures, no less than 32 have the mark "*w*¹" attached to them; a weight, as the author himself observes, representing nearly worthlessness. More than this, 12 out of these 36 objects have this weight assigned to the measures both of their position angles and distances, so that the measures of *one-third* of the objects in the first hour of R.A. are avowedly useless for any practical purpose, and there is a residuum of 8 more such measures to be distributed amongst the remaining 24 objects. On presenting the medal, the Astronomer Royal, observing that the character of the Council was most deeply pledged in the award, requested that Captain Smyth would present the original observations on which the Catalogue was based to the Society, in order that, if occasion should arise, these MSS. might be readily consulted by any Fellow. In presenting these, Captain Smyth wrote as follows: "Previously, however, to its removal [from Hartwell], a most careful scrutiny has been instituted of the slips and other papers with the printed *Cycle*, and various typographical errors have been detected in consequence. Some printed lists of these are herewith forwarded for any Fellows of the Society who may possess a copy of the work." As possibly every copy of the *Cycle* does not possess this list, I have transcribed the portion relating to vol. ii., and inserted it at the end of these Notes. Some few years ago, being much interested at the time in certain stars of the "*Bedford Catalogue*" which had apparently disappeared, I took the earliest opportunity I had of examining these original MSS., and was astounded to find the most extraordinary discrepancies between the printed Catalogue and the originals—discrepancies which at once accounted for the apparent anomalies. About the same time Mr. Burnham was sending to the *English Mechanic* some most admirable and searching criticisms on

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Smyth's measures. As the opinion of so eminent an observer will carry deserved weight with it, I may be permitted to quote the following words from one of his letters on the subject: "No publication of original observations, in this or in any other language, can be named which contains so many serious errors. The measures of the Struves, Dembowski, Dawes, Secchi, and half a dozen others whose names might be mentioned, do not contain altogether more than a small fraction of the mistakes in the *Cycle* which have led to so much discussion and confusion.

. . . Ordinarily there is no difficulty in detecting the mistake at once. This is not the case with the *Cycle*. There is no theory which will account for the many serious discrepancies. The measures generally agree substantially with those which are given from prior observers, but the strangest part is that this agreement is kept up just the same where the earlier measures were all wrong." As far as I am aware, there is one Catalogue only, and that not an original one, which surpasses the "Bedford Catalogue" in inaccuracy, and that Catalogue is the "Reference Catalogue of Multiple and Double Stars," forming vol. xl. of the *Memoirs*. I have not included in my Notes any notices of errors in Smyth's measures of three or four seconds of arc in the distances, or two or three degrees in the position angles, such as those that occur in the measures of the companions of ζ Persei, γ_2 Virginis, δ Hydrae, γ Aquarii, and many other stars; nor have I alluded to mistakes in the magnitudes, alignments, diagrams, or descriptions, as such a course would have swelled these notes to an inconvenient length, and, indeed, would have been almost superfluous, as the proven inaccuracy of so many measures throws the greater doubt on all the others. Sir George Airy, in his address on the occasion of presenting the Gold Medal to Admiral Smyth, observed: "When the question shall be put regarding the measures of the 'Bedford Catalogue,' made at a critical time, and on which a future theory may hinge—Can these numbers be trusted with certainty to one or two-tenths of a second?—shall we be able to answer—Without doubt they can." Of this the Council were apparently satisfied, or else they would presumably not have awarded the medal to Admiral Smyth. I have thought it better, therefore, as the charge I have brought against the Bedford Catalogue is of a very serious character, to place an asterisk against the symbol of the observer whose erroneous measure Smyth appears to have followed, so that anyone may be able to detect the source of Smyth's error at a glance in cases where he has presumably copied the measures of others; but, for the sake of brevity, I have only given one or two correct measures for comparison. The symbols used are those commonly employed.

1878, Dec. 13.

α Cassiopeiae. Cycle, No. 20.

	$^{\circ}$	"	
H.	275.4	56.2	1781.97
*H ₂ .	278.8	90.±	IV. Cat.
Sm.	278.4	96.9	1831.86
Ja.	279.5	61.4	1856.7

Sm. says (*Cycle*, p. 12): "The difference in distance is so remarkable that it must be imputed to instrumental error [on the part of H] rather than that the acolyte is describing an ellipse round its primary." He re-examined it in 1851, on a friend's pointing out the mistake to him, and deduced a result closely agreeing with Jacob's. (*Spec. Hart.*, p. 217.)

P. I. 222. *Arietis*. Cycle, No. 78.

	$^{\circ}$ A-B "		$^{\circ}$ A-C "		A-D			$\overset{A}{m}$	$\overset{B}{m}$	$\overset{C}{m}$	$\overset{D}{m}$
N.	53.5	2.4	167.4	39.5	caret	caret	1832.4	8.5	11.0	9.2	caret.
Sm.	53.0	2.5	165.0	40.0	359.2	165.0	1834.9	6	15	10	9
D.	53.7	2.4	165.6	36.2	1.6	182.5	1862.9	9	10½	9¼	6¼

(*Cf. Monthly Notices*, vol. xxiii., pp. 11, 78, 93.) Smyth's diagram agrees exactly with his description of this object in the Bedford Catalogue. Kn. gives 183''7 for distance of D, (1862.9).

55 Cassiopeiae. Cycle, No. 84.

Hind gives $0^h\ 18^m\ 2^s.1 + 63^{\circ}\ 28'\ 17''$ (1878.0) for the place of *Nova* 1572, after D'Arrest.

θ Persei. Cycle, No. 109.

	$^{\circ}$ A-C	"	
Sm.	219.0	27.0	1833.6
Flam.	218.5	68.0	1877.6

Smyth's diagram agrees with his published results. His distance is totally erroneous, and is probably owing to H's remark that there is a third star *within* 1'.

γ Persei. Cycle, No. 124.

	$^{\circ}$	"	
*H ₂ .	224.9	60	Vth Cat.
Sm.	226.0	55.0	1837.6
Bu.	324.1	caret	1876

Typographical error in Herschel's Vth Catalogue of 224.9 for 324.9, which Smyth has followed.

β Persei. Cycle, No. 127.

	^o	"	
Sm.	195 ^o 0	55 ^o 0	1835 ^o 6
Bu.	192 ^o 4	81 ^o 9	1878 ^o 6

I do not know of any other observations of this star. Smyth's distance is evidently erroneous.

 ϵ Pleiadum. Cycle, No. 138.

	^o	"	
Sm.	335 ^o 0	45 ^o 0	1835 ^o 01
Main.	331 ^o 1	64 ^o 6	1863 ^o 1

I have not seen any other measures.

 τ Orionis. Cycle, No. 196.

	A-B		A-C		
	^o	"	^o	"	
*H ₂	250 ^o 4	18 ^o 0	63 ^o 8	18 ^o 0	Vth Cat.
Sm.	255 ^o 0	15 ^o 0	65 ^o 0	20 ^o 0	1835 ^o 9
Bu.	250 ^o 1	35 ^o 98	59 ^o 8	35 ^o 97	1878 ^o 2

Burnham has found B to be a close double. Smyth has followed Herschel II.

 ν Aurigæ. Cycle, No. 229.

	^o	"	
H.	208 ^o 2	53 ^o 72	1782 ^o 7
Sm.	201 ^o 9	85 ^o 0	1833 ^o 7
Bu.	207 ^o 0	55 ^o 0	1877 ^o 8

331^o80 in Hh. (p. 82) is a mistake. Sm. remarks: "The discordance in the distance is very great."

 α Orionis. Cycle, No. 231.

	^o	"	
*H.	152 ^o 3	161 ^o 8	1780 ^o 9
Sm.	155 ^o 0	160 ^o 0	1832 ^o 7
Bu.	152 ^o 3	174 ^o 7	1877 ^o 9

 θ Aurigæ. Cycle, No. 233.

	^o	"	
*H.	286 ^o 0	35 ^o 3	1782 ^o 7
Sm.	289 ^o 0	30 ^o 0	1832 ^o 6
OZ.	290 ^o 5	48 ^o 3	1852 ^o 1
Bu.	292 ^o 7	45 ^o 5	1878 ^o 0

OZ has lately discovered A to be a close double (5^o5 : 2''^o15, '71). There are several other comites.

β *Canis Majoris*. *Cycle*, No. 246.

	\circ	"	
Sm.	339 \circ	104 \circ	1833 \cdot 7
Bu.	339 \cdot 7	183 \cdot 9	1877

Smyth's distance is preposterous.

61 *Geminorum*. *Cycle*, No. 286.

	\circ	A-B	"	A	B
				m	m
Sm.	110 \circ	60 \circ	1835 \cdot 8	7 $\frac{1}{2}$	9

Mr. Webb mentions (*Monthly Notices*, xxxv., p. 340; *Celestial Objects* (3rd edition), p. 247) that on two occasions, in 1852 and 1855, he failed to see Smyth's 9^m star. On the latter occasion, however, he found an exceedingly minute star, at about the right distance, with an estimated position angle of 185° or 190°. Mr. Knott also failed to see any star in the position of the one given by Smyth in the Bedford Catalogue, but noticed a minute star having a position angle of 170° or 175° at a distance of 75". This star is the same as the one mentioned by Mr. Webb. I find, on referring to Smyth's diagram of this object in the MSS. of the Bedford Catalogue, that the position angle is undoubtedly about 170°. As he only credited his measures with a weight of 1—a weight which, by his own admission, represents nearly worthlessness—the apparent alteration in the distance may be easily explained. Smyth's magnitudes are so exceedingly vague and inaccurate that no suspicion of variability can be entertained for a moment. Sm. gives the distance of the companion to the next star but one in the *Cycle* (63 *Geminorum*; *Cycle*, No. 288) as 50". H, in 1783, gave 44".25; Main, in 1863, 44".61. Mistakes of this kind, however, occur so frequently in the Bedford Catalogue as to be hardly worth noticing in detail.

β *Canis Minoris*. *Cycle*, No. 289.

	\circ	A-B	"	\circ	A-C	"
Sm.	80 \circ	35 \circ		312 \circ	105 \circ	1831 \cdot 8
Bu.	73 \cdot 2	120 \pm		311 \cdot 2	141 \cdot 8	1877 \cdot 1

Burnham observes of the discrepancies between the published distances of these companions and of the comes of β *Canis Majoris* and his own measures: "Of course any such change since Smyth's observations is out of the question."

45 H IV . *Geminorum*. *Cycle*, No. 290.

	\circ	"	
*H ₂ .	355		1833
Sm.	355 \circ	95 \circ	1836 \cdot 2
O Σ .	2 \cdot 38	100 \cdot 12	1853 \cdot 2
Kn.	2 \cdot 44	100 \cdot 16	1864 \cdot 9

OΣ remarks (*Mélanges* etc., iii., p. 572): “La direction 85° *n.p.*, estimée par Sir John Herschel, est erronée. Probablement il faut lire *n.f.* au lieu de *n.p.* Cependant il est bien curieux que la même erreur soit commise par l’amiral Smyth dans son Bedford Catalogue.”

a Canis Minoris. Cycle, No. 298.

Sm. 85° 145° (MSS. Δ R.A. $18^{\circ}3$) $1833^{\circ}81$ B 8° .

This is the celebrated missing star near *Procyon*. A moment’s inspection will show that the two distances given by Smyth are irreconcilable the one with the other. Taking the proper motion of *Procyon* into account, the estimate Δ R.A. = $18^{\circ}3$ will accord fairly well with the actual distance of a small star of about the 9th magnitude, which has been found to be a close pair by Bird, and independently detected to be such by Burnham and Dembowski. The following are some of the measures:—

	$^{\circ}$	"	
Se.	$83^{\circ}60$	$331^{\circ}62$ (misprinted $33^{\circ}162$)	$1856^{\circ}16$
Morton.	$83^{\circ}89$	$327^{\circ}6$	$1857^{\circ}92$
Powell.	$83^{\circ}1$	$332^{\circ}2$	$1860^{\circ}82$
Flammarion.	$80^{\circ}5$	$346^{\circ}5$	$1877^{\circ}17$

175 P. VII. *Argus.* Cycle, No. 301.

	$^{\circ}$	"	
*Piazzi, (reduced)	$325^{\circ}0$	$10^{\circ}5$	$1800^{\circ}0$
Sm.	$326^{\circ}8$	$9^{\circ}8$	$1831^{\circ}9$

Smyth’s position angle is quite erroneous. Ja. gives $318^{\circ}8$ ($1846^{\circ}2$).

δ *Canceri.* Cycle, No. 335.

		'	
*H ₂ .	160	25	II Cat.
Sm.	163 $^{\circ}0$	25 $^{\circ}0$	1838 $^{\circ}2$
Lamont.	123 $^{\circ}8$	27 $^{\circ}94$	1836 $^{\circ}2$
Bu.	113 $^{\circ}9$	40 $^{\circ}97$	1878 $^{\circ}2$

Cf. “*Observatory*,” No. 14. Smyth has copied Herschel’s fallacious measure.

78 H I. *Ursæ Majoris.* Cycle, No. 365.

Sm. R.A. $9^{\text{h}} 34^{\text{m}} 52^{\text{s}}$, 1840 $^{\circ}0$. D’Arrest, in his *Sid. Neb. Obs. Hav.*, points out that Herschel’s R.A. of this nebula is 1^{m} too little. Smyth, though he professes to have determined its place independently, has fallen into the same error. Taking D’Arrest’s R.A. as correct, Smyth’s should be $9^{\text{h}} 35^{\text{m}} 47^{\text{s}}$, 1840 $^{\circ}0$.

ψ Leonis. Cycle, No. 366.

ψ Leonis is not variable, as stated in the Bedford Catalogue. It is probably confused with R Leonis, the place of which for 1840.0 is $9^h 38^m 57^s + 12^\circ 10'0$.

γ Leonis. Cycle, No. 376.

M. Flammarion remarks (*Catalogue des Étoiles doubles et multiples etc.*, p. 59): "Il y a encore un autre point douteux. Sm. qui a mesuré tant de compagnons éloignés, n'a pas mesuré celui-ci [viz. C at $292^\circ 8' : 229'' 3 : 1877$], quoiqu'il ait mesuré cinq fois γ de 1831 à 1843, et il a écrit: 'There are two stars in a line with A in the *n.p.* quadrant.' C'est évidemment l'une de ces étoiles. Il y en a une autre, D, de huitième grandeur, plus éloignée que C, et formant avec elle angle de $328^\circ \pm$ à une distance d'environ le tiers de AC, et une autre, E, de dixième grandeur plus loin encore, à une distance un peu plus grande que celle de CD, et un peu plus au nord: elles sont presque sur une même ligne avec C, mais D n'est pas du tout sur la même ligne que C relativement à A, et pour quelle s'y soit trouvée il y a 40 ans, il faut que le déplacement ait été plus grand que celui de γ ." On referring to the diagram of this object in the MSS., I find that C and D are by no means in the same line with A. Many of the descriptions of such objects in the text of the Bedford Catalogue are deplorably inexact, and no reliance whatever can be placed in them.

β Leonis. Cycle, No. 425.

	^o	["]	
Sm.	114.0	298.0	1833.5

Smyth's position angle should be increased by 90° . It is not at all probable, as Burnham has remarked, that the small star seen by Kn. is Smyth's, and is therefore a variable.

62 H IV. Ursæ Majoris. Cycle, No. 452.

	^h	^m	^s	
Sm.	RA.	11	47 3	1840.0

Herschel's R.A. is, according to D'Arrest, 1^m too small. Smyth states that "its mean apparent place was obtained by differentiation from that of γ Ursæ Majoris." It is remarkable, therefore, that his R.A. is also 1^m behind the correct one. It should be $11^h 48^m 6^s$, 1840.0.

53 Virginis. Cycle, No. 472.

	^o	["]	
*H ₂ .	30.0 \pm	50	V. Cat. "Position by diagram."
Sm.	35.0	45.0	1833.4
Bu.	9.3	70.56	1878.2

61 *Virginis*. Cycle, No. 477.

*Hl.	345.0	73.25	1783.0
Sm.	340.6	Δ R.A. 2.8	1832.3
Kn.	22.6	169.29	1862.3
Bu.	25.2	189.34	1878.3

Smyth's observation is incomprehensible on the assumption that he really examined the star.

10 [54] *Hydræ*. Cycle, No. 519.

Hl.	128.2	11.29	1783.0
*H. & S.	136.7	9.95	1822.9
Sm.	138.4	9.8	1831.5
Howe.	129.8	9.68	1876.4

Smyth says that the measures of H. and S. show "a considerable direct motion in the elapsed time, which my measures appear to substantiate."

212 P. XIV. *Libræ*. Cycle, No. 524.

	A-B	"		B-C	"	
S. & H.	270.1	10.82	1823.3	*H ₂	321.5	20.0 V. Cat.
Sm.	272.6	10.3	1833.4			
Ja.	284.0	13.34	1856.4	Sm.	A-C 320.0	20.0 1833.4
Bu.	290.8	15.30	1878.3	Bu.	322.2	120.6 1878.3

H₂ gives the position of B-C correctly. Smyth has overlooked the fact that Herschel measured B-C, and has given almost the same measures for A-C. There is no misprint in the Bedford Catalogue, as the diagram of the object in the MSS. agrees exactly with the *Cycle*. (Cf. *English Mechanic*, Nos. 687 and 690, May 24 and June 14, 1878.)

11 *Libræ*. Cycle, No. 532.

Hl.	59.05	1781.4
*H. & S.	50.63	1822.8
Sm.	51.3	1837.4
Bu.	57.5	1878.4

Here Smyth has followed Herschel and South's erroneous measure.

764 H II. *Draconis*. Cycle, No. 550.

Sm. R.A. $15^h 35^m 53^s$, 1840°0. Using D'Arrest's correction, this should be $15^h 35^m 25^s$. The R.A. of Herschel II. is also in error.

39 *Serpentis*. Cycle, No. 554.

	°	"	
Sm.	355°0	12°0	1835°57

Herschel II. says of this object (*Memoirs*, vol. xl., p. 139): "This star, 39 *Serpentis*, is described by Smyth as identical with H III. 25; but it is H III. 25 [45 in original, but evidently 25] described by H as 39 *Serpentarii*, not *Serpentis*, and is accordingly set down in *h's* synopsis of Hh. as 39 *Ophiuchi* (another name of *Serpentarius*) to avoid the equivoue of the abbreviation *Serp.*, and is in R.A. 17^h , N.P.D. 114° . It is remarkable, however, that the measures given by H and by Smyth agree both in position and distance, and both agree with those of 36 *Ophiuchi* (which see).—J. H." Smyth says of 39 *Serpentis*: "This object is 25 H III., and was thus registered by its discoverer. Pos. $357^\circ 14'$, Dist. $10''0$, Ep. $1780\cdot65$." Sm. gives for 36 *Ophiuchi* (Cycle, No. 607) $355^\circ 6' : 11''\cdot6 : 1830\cdot63$; $356^\circ 2' : 12''\cdot1 : 1838\cdot52$; and remarks: "It is 25 H III., . . . and was thus micrometrically measured at Slough.—Pos. $357^\circ 14'$, Dist. $10''\cdot03$, $1782\cdot46$." 39 *Serpentis* has no companion, and it is abundantly evident that Smyth mistook Herschel's *Serp.* (i.e. *Serpentarii*) for *Serpentis*, and has *measured*, therefore, a companion which has no existence, and moreover was careful that his measures should agree with the supposed prior observation of H. It is noteworthy that these *measures* are stated to have been made in the year 1835, in which year he did not make any measure of 39 *Ophiuchi*. Smyth actually gives the colour of the star he did not observe!

136 P. XVI. *Herculis*. Cycle, No. 580.

Sm. R.A. $16^h 30^m 26^s$, 1840°0. It should be $16^h 31^m 26^s$, 1840°0, on the authority of the *Catalogus Generalis*.

μ^1 *Sagittarii*. Cycle, No 639.

	A-B "		A-C "		A-D "		
*H ₂ .	262°5	12	313°8	45	115°2	40	V. Cat.
Sm.	260°0	10°0	315°0	40°0	114°5	45°0	1835°6
Bu. 1878°4	259°2	16°9	312°9	48°6	115°4	50°5	Ja. 1847°3

185 and 186 P. XIX. *Antinoi*. Cycle, Nos. 702 and 703.

Cf. Dawes (*Memoirs*, vol. xxxv., pp. 494-496; *Notices*, vol. xxiii., pp. 34-37); Hunt (*Notices*, vol. xxxii., pp. 90, 91, &c.).

Smyth's position angles and distances are utterly inaccurate; and, to make matters worse, he has followed the erroneous results of H. Full explanations of the matter will be found in the papers cited above.

54 *Sagittarii*. Cycle, No. 705.

	A-B		A-C		
	°	'	°	'	
*H ₂ .	13.6	25 ±	273.0	15 ±	IV. Cat. (No. 1424)
Sm.	42.8	28.5	280.0	20.0	1837.58
Main.	41.4	45.90	caret.		1861.73
Bu.	41.7	45.57	244.5	35.76	1878.7

Herschel's 13°.6 is probably a misprint for 43°.6. A-B are first mentioned in Herschel's 2nd Catalogue, as H. 599, and the measures therein recorded are 6, 10 : 40° : 40'' : 1826.58. Smyth did not notice this, and so copied the error in Herschel's measure in Catalogue IV. Ja. gives for the distance of A-B 45''·6 in 1845.8. Smyth refers in the text to Herschel's observation of C in the IVth Catalogue (No. 1424), and has followed Herschel's inaccurate observations of that star also. Considerable mistakes in the position angles and distances of small stars are not uncommon in the Catalogues of the younger Herschel.

295 P. XIX. *Cygni*. Cycle 719.

This is *not* Kirch's variable, which is between χ (Flamsteed) and P XIX. 295. Sm. has followed Bailly and Piazzini. (Cf. Stone in *Monthly Notices*, vol. xxvi., p. 273.)

2 P. XX. *Aquilæ*. Cycle, No. 733.

Sm. R.A. 20^h 1^m 51^s, Dec. +16° 26'·8, 1840.0. Smyth's R.A. should be increased by 26^s, and his Decl. diminished by 7'·0.

α^2 *Cygni*. Cycle No. 739.

	A-D					A-B		
	°	'	''			°	'	''
*Σ. (as quoted by Sm.)	333	41.9	337.38	1835.95	*H ₂ .	332.8	20	H. 1945
Sm.	333.8		338.0	1838.67	Sm.	330.0	15.0	1838.67
Σ (M. M., p. 270)	323	41.9	337.833	1835.95	Bu.	321.7	36.82	1878

Here Smyth quotes Struve's position angle as 333° 41'·9, with which his own position angle, credited with a weight of 9, agrees within the *tenth* of a degree. Herschel's distance of A-B is largely in error, and Smyth, as is usual, has followed him. The Bedford MSS. give 333°.8 for A-D, so that there is no misprint.

178 P. XX. *Delphini*. Cycle, No. 751.

	° A-C	"	
*H ₂ .	121.5	20.0	IV. Cat.
Sm.	125.0	20.0	1835.91
Bu.	108.4	23.4	1878.2

β Delphini. Cycle, No. 756.

	° A-C	"	
*H ₂ .	107.7	18.0	V. Cat.
Sm.	105.5	15.0	1834.79
Lamont.	112.8	33.1	1836.8
Bu.	115.7	27.4	1878.6

Lamont gives 202° 49' 5", which I have diminished by 90°.
Bu. has found A to be a close double.

α Cygni. Cycle, No. 760.

	°	"	
H.	90.0 ±	60.0 ±	1790.69
*H ₂ .	104.1	Δ R.A. 7.3	IV. Cat.
Sm.	102.5	108.5	1837.65
Bond I.	88.3	95.5	1848

β Equulei. Cycle, No. 784.

	° A-B	"	° B-b	"	° A-C	"	
*H ₂ .	314.4	40.0	14.5	2.0	278.0	50.0	V. Cat.
Sm.	317.0	35.0	15.0	3.0	275.0	50.0	1836.68
Bu.	308.7	67.4	10.4	6.0	275.9	86.3	1878.6

β Aquarii. Cycle, No. 786.

	° A-B	"	
*H ₂ .	322.8	20.0	IV. Cat.
Sm.	320.0	25.0	1833.73
Bu.	320.0	34.25	1877.7

20 *Pegasi*. Cycle, No. 799.

	° A-B	"	
*H ₂ .	320.0	40	H., I. Cat.
Sm.	330.0	35.0	1838.66
Bu.	326.1	51.3	1877.7

Alternative Measures of Distance from the MSS.

	Δ R.A. s		Δ R.A. s		Δ R.A. s
β Cassiopeiae	19.1	α Orionis	6.8	α Canis Minoris	18.3
α Andromedae	4.57	μ Geminor.	5.4	α Boötis	15.1
14 Arietis, A-C	3.8	β Can. Maj.	4.7	δ Boötis	7.9
\circ Ceti	7.8	ζ Gem., A-B	1.8	δ Aquilæ	6.6
δ Persei	7.0	„ A-C	5.0	α Cephei	9.8 (w_1)
257 P. IV. Tauri, A-C	4.3	δ Can. Maj.	13.5	„	8.8 (w_2)
γ Orionis	3.6	30 Can. Maj.	5.6	4 Cassiop., A-C	25.3
β Leporis	13.1	η Can. Maj.	13.4	„ A-B	7.4
ϵ Orionis	9.8	63 Geminor.	1.8	γ Cephei, about	44
124 Tauri, A-B	5.5	145 P. VII. Argûs	1.5	171 P. XXIII. Androm., A-C	8.4
„ A-D	1.0				

ERRATA (from the List issued by Admiral Smyth).

"A rigorous re-examination of Captain Smyth's *Cycle of Celestial Objects* has led to the detection of the following typographical errors. These the Amateur-Astronomer is earnestly requested to correct in his copy with a pen, in order that they may occasion no loss of time to him.

VOLUME II.

- Page 25, No. xxxix., for R.A. $0^h 57^m 23^s$ read $0^h 57^m 39^s$.
 „ 33, No. xlix., for Dec. $57^\circ 56'9$, read $57^\circ 28'9$.
 „ 34, No. l., l. 4, for Epoch 1830.39, read 1830.89.
 „ 46, No. lxxiv., for Dec. $37^\circ 27'9$, read $36^\circ 27'9$.
 „ 54, No. lxxxvii., for R.A. $2^h 1^m 16^s$, read $2^h 1^m 12^s$.
 „ 67, No. cix., for R.A. $2^h 33^m 8^s$, read $2^h 33^m 18^s$.
 „ 94, No. cliii., for R.A. $3^h 59^m 6^s$, read $3^h 59^m 11^s$.
 „ 115, No. clxxxviii., for Dist. of AC = $15''.1$, read $15''.0$.
 „ 152, No. ccli., for R.A. $6^h 22^m 45^s$, read $6^h 22^m 25^s$.
 „ 199, No. cccxxix., for R.A. $8^h 30^m 31^s$, read $8^h 30^m 41^s$.
 „ 227, No. ccclxxiv., for Mean N.P.D. (l. 5) $77^h 15^m 12^s.43$, read $77^\circ 15' 12''.43$.
 „ 256, No. ccccxvii., for Leo, l. i. of Description, read Ursa.
 „ 289, No. ccclxviii., for R.A. $12^h 51^m 30^s$, read $12^h 51^m 26^s$.
 „ 300, No. ccclxxxii., for μ Hydræ, read ν .
 „ 335, No. dxxxiii., for 22 M., read 102 M.
 „ 371, No. dlxxxv., l. 2, for 15^h , read 16^h .
 „ 392, No. dexvii., for Σ 's $\angle 76^\circ 77'$, l. 32, read $76^\circ.77$.
 „ 411, No. dxxxxvii., for \angle in 1842.39 = $255^\circ.0$, read $259^\circ.5$.
 „ 442, No. delxxxii., for Dec. $35^\circ 15'2$, read $32^\circ 15'2$.
 „ 453, No. dcevi., for 51 H V. read 51 H IV.
 „ 454, No. deex., for 36 H V., l. 2, ab imo, read 46 H V.
 „ 534, No. deccxxxviii., for Dec. $64^\circ 24'3$, read $61^\circ 24'3$.

Postscript.

I have received the two following measures by letter from Mr. Burnham, too late for insertion in the body of my paper.

β *Andromedæ*. Cycle, No. 43.

	\circ	A-B	"
Sm.	299.0	225.0	1839.5
Bu.	293.6	297.9	1878.9 (single distance)

δ *Persei*. Cycle, No. 135.

	\circ	A-B	"
Sm.	315.0	140.0	1833.7
Bu.	313.3	108.62	1878.9

I do not know of any other measures. Mr. Burnham's are made with the magnificent Dearborn refractor of $18\frac{1}{2}$ inches aperture.

Clapham,
1878, December 18.

Note on some hitherto Unnoticed Features near the Lunar Crater Hyginus. By Lord Lindsay and Dr. R. Copeland.

It may be as well to preface the following note by the statement that it is not the intention of the writers to prove or disprove the existence of active volcanic agency in the Moon at the present moment. The sole object in view is to place on record certain not uninteresting observations confirming the well-known fact that the neighbourhood of the lunar crater *Hyginus* is full of complicated shallow irregularities and strongly marked differences of tone, which tend together to produce great apparent changes of surface configuration with change of illumination, and further to show that there exist striking features in the immediate neighbourhood which have hitherto escaped clear detection, but of which some traces may be found in the comparatively old map of Lohrmann.

During the night of October 17, 1878, the terminator passed over *Hyginus*. The whole night was fine, and the definition good, at times exceptionally so.

Under these circumstances the configurations of the region adjoining Schröter's well-known Rille were revealed in a very full degree. Six drawings were made between $12^h 20^m$ and 17^h G.M.T. Reserving for a future occasion a fuller discussion (based on micrometrical measures) of all these sketches, special attention is drawn to Nos. I, III, V, and VI.

Sketch No. I, which is a general representation of everything that is visible near *Hyginus*, exhibits no trace of a crater to the S.W. of *Hyginus*; but in No III, taken at $15^h 15^m$, a crescent-shaped ridge is shown abutting on that side of the crater.